

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

RECEIVED

JUL 19 1996

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )  
 )  
Report and Order 96-208 Amending Parts 2 )  
and 15 of the Commission's Rules to ) ET Docket No. 95-19  
Deregulate the Equipment Authorization )  
Requirements for Digital Devices )

DOCKET FILE COPY ORIGINAL

INTRODUCTION

Intel Corporation is the world's largest supplier of high technology components and subassemblies to the PC industry. Customers of our server and PC platform products are companies that add features for the purpose of offering a complete custom solution. We only offer these products as an OEM supplier. At times, we consider ourselves uniquely qualified in the area of "Plug and Play" Conformity Assessment. For years we have observed that there is not an established program for conformity assessment that fits the field-installed module and system integration industries. We estimate that system integrators account for approximately 40% of all computer sales. Although the computer industry has successfully focused on the goal of "Plug and Play" modules, this concept has not extended to the parameter of EMI. We applaud the Commission for their efforts in addressing this difficult and significant issue. We have found some of the Commission's breakthrough thinking on this issue most valuable. We have the following recommendation for improving the program the Commission has created and have a request for clarification on a pair of matters brought up by the Commission in its Report and Order.

No. of Copies rec'd  
List A B C D E

013

### CPU BOARD TESTING

We acknowledge that the Commission's program of testing CPU boards with the host system cover removed then allowing system integrators to install these boards without a retest, will certainly result in continued control of interference. However, we are convinced that this program will be impractical to the computer industry and will be doomed to fail. The program does not acknowledge the importance of the host system enclosure in providing shielding. CPU boards typically have much higher radiated emissions than allowed by the Commission's 3 dB margin. We foresee that system integrators will be initially motivated by having a program tailored for their business. They will actively seek CPU board suppliers that can provide FCC Authorized CPU boards so they can utilize them and finally comply with federal law without a cost prohibitive retest. They will soon discover that there are few, if any, high technology CPU boards that can meet this expectation. They will then give up trying and revert back to their present practice with the knowledge that there still is no practical way to comply with federal law.

Even if the CPU board industry, after lengthy and arduous design efforts, are able to produce FCC Authorized CPU board products, the resultant impact on the public will be a significantly more expensive end-product. This is because the computer industry was not, due to federal law, allowed to seek their own best design solutions, most of which would include use of the less expensive and existing host system enclosure as a shield.

We acknowledge the difficulties in finding a program that includes consideration of the computer case as part of a modular integration concept. Certainly any EMI expert can point out weaknesses in joining a computer case with unknown EMI characteristics with a CPU board tested only with a particular computer case. However, the same EMI expert must also acknowledge the compromises that were necessary in the present program, such as using a mouse, printer or monitor with a host system they were not tested with, or allowing add-in assemblies, such as hard drives and memory boards, without a retest. The EMI conformity assessment scheme has always been an exercise in compromise of absolute assurance. This has not prevented the Commission program from being a very successful program in spite of these compromises. It is noteworthy that, according to the FCC's own survey covering a two-year period, there were only a handful of valid EMI interference complaints from the public due to computer products. There is not that significant a problem to remedy. We consider it vitally important to find a practical solution for the industry so that modules sold to the public, and system integration activities, presently operating without a viable program, can be included in the scheme. Otherwise, the Commission will again be left with a program that a significant portion of the industry will be forced to ignore. The most significant goal is to provide a modular assessment structure that motivates module suppliers to concern themselves with points of discontinuity, shielding, filtering and other true EMI design concerns, and to have integrators searching for the quietest CPU board and case combinations that fulfill the needs of the public. The few excursions that result will most certainly not be as significant as having no program at all.

To resolve this problem, we propose to extend the breakthrough "Cover OFF" concept advanced by the Commission. Our proposal involves an authorization program for computer cases that is based on disclosure. An FCC Authorized computer case would consist of a case that includes a disclosure statement describing its shielding effectiveness. This shielding effectiveness would be determined by comparison EMI testing with the computer case cover on versus off. The resultant difference in radiated emissions for a certain noise source inside the case would constitute the case shielding effectiveness. It would not matter what the EMI source was as long as the radiated emissions were sufficiently measurable across the frequency spectrum with the cover on. We foresee the industry developing noise source boards that would fulfill this purpose. This disclosure information could be in many forms. Some examples are

1. *Disclosing only the minimum shielding effectiveness at any frequency.* This would be most appropriate for enclosures with a relatively uniform shielding effectiveness across the frequency spectrum. This information would be very easy for a system integrator to apply in the integration process.
2. *Disclosing a set of minimum shielding effectiveness figures for a particular set of frequency ranges.* For example, "Minimum 20 dB from 30 MHz to 100 MHz, Minimum 17 dB from 100 MHz to 300 MHz" and so on, similar to a list of nutrients found on the side of a cereal box. This would be applicable for a computer case that has a wider variation of shielding effectiveness at different frequencies.

3. Providing a complete radiated emissions shielding effectiveness graph. This would apply for computer cases that had particular strengths or weaknesses at certain frequencies that a system integrator must be aware of.

It would not be necessary for the Commission to exactly specify the form that the disclosure must be. The Commission's goals would be achieved by simply requiring a disclosure of minimum shielding effectiveness for the entire frequency spectrum. Of course, it would be required that this disclosure be backed up by a suitable test report from an accredited EMI test facility in accordance with the Commission's present test procedures and test facility program.

The Commission can also consider the computer case program as a voluntary FCC Authorization program. We believe the market pressures from integrators would be sufficient motivation for computer case suppliers to provide FCC Authorized cases with corresponding disclosure information.

With the computer case authorization program in place, the CPU board authorization program could be extended as follows. A CPU board can be FCC Authorized if:

1. It has radiated emission that to not exceed 3 dB over the end-product limit when tested with the cover OFF (Commission's present plan), OR
2. It has radiated emissions under the FCC limits for end-products when tested in a representative application with the cover ON AND it is provided with mandatory disclosure information describing its radiated emissions characteristics that exceed 3 dB above the present end-product limits with the cover OFF, similar in format to

the information for computer cases described above

One of these two options would be considered mandatory for CPU boards

The requirement for system integrators would be to choose to purchase either Item 1 type CPU boards (see above), or purchase Item 2 type CPU boards if they use an FCC Authorized computer case with shielding effectiveness greater than the radiated emissions above the "Cover Off" limits of the CPU board, at all applicable frequencies. We acknowledge the concern that system integrators may not be sufficiently technically competent to make this comparison determination. However, system integrators are not the same as users. Our experience with system integrators, even garage integrators, is that while they are not EMC experts, they are highly competent technical computer experts that must inherently deal with a variety of technical disciplines in order to survive in their profession, and would easily be able to deal with this simple structure. This must be compared with the present program of having no control over 40% of the computer industry. From our viewpoint, the Commission has little choice but to adopt a program such as this.

The advantages of this new "Disclosure" option are that the development of high technology circuitry will not be nearly as hampered. In the flurry of developing new computing solutions common errors in a "perfect" board EMC design can much more easily be compensated for by a reasonably designed computer case, all of which can be assessed by the integrator. Also, CPU board suppliers will be much more motivated to provide products which will work with this approach, thus ensuring a supply of products for system integrators which will allow them to produce products with a minimum of interference potential.

#### LABELING

In its Report and Order, the Commission created two new labels for Class B computing devices. These labels are for 1) products which have been tested as a system by an accredited laboratory and are being approved under a Manufacturer's Declaration of Conformity and, 2) for products which are assembled from previously approved components and are being issued a Manufacturer's Declaration of Conformity based on the previous approval status of the component parts. While the concept is clear, we are requesting clarification in the CFR concerning the continued use of the "integrators rule" whereby a previously "tested" host system marking continues to be valid when approved add-in peripherals, such as I/O cards, are added by a system integrator. In other words, if a system which is labeled as "tested" for compliance to the limits for a Class B computing device under a Manufacturer's Declaration of Conformity, has additional approved components added to it, can the system integrator continue to utilize the "tested" label

needed under the first option, or does a second label, stating that the product was assembled from approved parts (either under a Manufacturer's Declaration of Conformity or an FCC Grant of Equipment Authorization) have to be placed on the product? The wording in the Report and Order does not make this totally clear.

#### **SPECIAL TREATMENT OF CPU BOARDS**

In its Report and Order, the Commission created a special test requirement for CPU boards. This special requirement mandates that CPU boards, in order to be FCC Authorized for use in systems not requiring testing after integration, must be able to meet the radiated emissions limits with a 3 dB relaxation with the cover removed from the computer case and must pass with the cover in place. This requirement does not apply to any other part which might be used in constructing a system and granting approval to the completed system based on the use of previously approved component parts. We do not understand the unique treatment of CPU boards in this Report and Order.

In order to demonstrate that a CPU board meets the requirements of the new test in the Report and Order, it must be tested as part of a complete system with the cover removed from the system cabinet. In order for the CPU board to pass, the entire system must pass with no signals more than 3 dB over the Class B limits for computing devices. This presupposes that components in the system, which did not have to pass with the cover removed when they obtained approval (such as I/O cards, display cards, etc.) will demonstrate the required level of compliance with the cover removed. We see no evidence that such will be the case. It is not uncommon for video cards, I/O cards and the



like to have their own clock circuits and to contribute significantly to the emissions profile of a system. As such, it is not reasonable to expect that such devices will show the required emissions profile (limit  $\pm 3$  dB) with the cover removed. In addition, other parts of the system are not required to be approved at all and are only considered as part of a complete system with the cover in place. An example of this class of component is a hard disk drive. They are needed in order to fabricate a complete system for the purpose of a test and the success of the test will be determined by their emissions profile, as well.


In light of the above, we must request that the special treatment of CPU boards be eliminated, that a means of allowing for emissions from other than the CPU board be included in the approval process or that the proposal we have put forward earlier in this document be adopted. Without some relief in this area, approval of CPU boards as separate components will be nearly impossible.

#### SUMMARY

In its Report and Order, the Commission has made great strides in improving a long successful program for reducing interference to radio and television communications services from home computing devices. The success of the original program can be measured by the small number of complaints of interference from computing devices filed with the Commission in recent years. We feel that the requests and suggestions contained in this document will, if adopted, further improve the program by making it possible for a greater number of system integrators to construct systems that will be in compliance with

the Commission's Rules. We thank you for this opportunity to comment on the subject Report and Order and look forward to hearing from you.

Dated: July 18, 1996

  
For GHERY PETTIT

Ghery S. Pettit, NCE  
Senior EMC Engineer  
Intel Corporation  
MS DP1-107  
2800 Center Drive North  
DuPont, Washington 98327



Doug Probstfeld  
Manager, Corp. Product Regulations  
Intel Corporation  
MS DP1-107  
2800 Center Drive North  
DuPont, Washington 98327